



Transportation
Safety Board
of Canada

Bureau de la sécurité
des transports
du Canada

Air Transportation Safety Investigation Report A18O0002

GROUND COLLISION, FIRE, AND EVACUATION

WestJet Airlines Ltd., Boeing 737-800, C-FDMB
and
Sunwing Airlines Inc., Boeing 737-800, C-FPRP
Toronto/Lester B. Pearson International Airport, Ontario
05 January 2018

About the investigation

The Transportation Safety Board of Canada (TSB) conducted a limited-scope, fact-gathering investigation into this occurrence to advance transportation safety through greater awareness of potential safety issues. It is not the function of the Board to assign fault or determine civil or criminal liability.

History of the flight

On 05 January 2018, a WestJet Airlines Ltd. (WestJet) Boeing 737-800 (flight 2425, registration C-FDMB, serial number 60127) had arrived from Cancún, Mexico, with 169 passengers and 6 crew members on board. At 1759,¹ it came to rest in Lane 2 of the north-side apron of Pier B at Terminal 3 of Toronto/Lester B. Pearson International Airport (CYYZ), Ontario. The engines were running, and the flight crew were waiting for ground personnel to marshal the aircraft into position at Gate B12.

The WestJet aircraft was positioned directly behind and perpendicular to a Sunwing Airlines Inc. (Sunwing) Boeing 737-800 (registration C-FPRP, serial number 39959), which was parked at Gate B13. The Sunwing aircraft was being prepared to be towed to another location at the airport. The auxiliary power unit (APU), which is housed in the tail of the aircraft, was operating and a maintenance technician employed by Sunwing was in the cockpit; there were no passengers or flight crew on board.

Two ground personnel (a tow vehicle operator and an assistant) employed by Swissport International Ltd. (Swissport) were in the cab of a tow vehicle connected to the nose of the Sunwing aircraft.

¹ All times are Eastern Standard Time (Coordinated Universal Time minus 5 hours).

At 1816:04, the tow vehicle operator radioed the Greater Toronto Airports Authority (GTAA) Apron Management Unit (AMU) and requested permission to push the Sunwing aircraft back. The AMU north apron radio officer informed the tow vehicle operator to "push back at your discretion," after which the tow vehicle operator began the pushback procedure. At this time, there were no other ground personnel, such as wing walkers,² in the area.

At 1816:31, the Sunwing aircraft's tail collided with the stationary WestJet aircraft's right wing. Shortly afterward, passengers on board the WestJet aircraft began standing up to get a better view of what had occurred, and the flight attendants (FAs) instructed everyone to remain seated. The WestJet flight crew informed the AMU of the collision. The AMU officer instructed the tow vehicle operator to pull the Sunwing aircraft back toward the gate.

At 1817:02, a large ball of fire erupted near the area of aircraft contact.

The WestJet flight crew were immediately aware of the fire, and began the evacuation process, which included following the Boeing 737-800 evacuation quick reference checklist (QRC). The flight crew made a Mayday radio call and informed the AMU that they were evacuating.

The AMU officer contacted aircraft rescue and fire-fighting (ARFF) services and air traffic control and informed them of the fire and the need for assistance.

At 1817:13, the Swissport tow vehicle operator pulled the Sunwing aircraft back toward the gate, away from the WestJet aircraft.

The maintenance technician on board the Sunwing aircraft activated the APU emergency fuel shut-off valve and discharged the associated fire extinguisher. The technician then exited the cockpit using the left cockpit window and the emergency rope, and sustained minor injuries in doing so. Once outside the aircraft, as an additional measure, the technician also deployed the mechanically operated APU fire extinguisher and fuel shut-off valve located in the aircraft wheel well.

When the Sunwing aircraft was pulled away, the fire on the wing of the WestJet aircraft self-extinguished. However, the fire on the tail of the Sunwing aircraft continued, but decreased in intensity.

When the fire erupted, some passengers on board the WestJet aircraft began to panic. Three seconds after the fire erupted, and before any commands from the crew, passengers seated at the forward left over-wing emergency exit opened the exit and escaped onto the wing; other passengers followed. At this time, the engines were still running.

Two FAs stationed at the rear of the aircraft saw the fire, realized that some of the passengers were panicking, and determined that an immediate evacuation was necessary. The rear FAs assessed the area surrounding the right rear exit and decided it was not safe to use that exit, given the location of the fire.

One of the rear FAs informed the lead FA, who was at the front of the aircraft, and the captain via interphone that there was a fire and that they were evacuating. At 1817:22, the left rear exit was opened and the slide was deployed.

² Wing walkers are ground personnel positioned near the wingtips of an aircraft during marshalling or pushback procedures. They assist the marshaller or tow vehicle operator in ensuring that the area surrounding the aircraft is clear.

The 2 front FAs did not immediately evacuate because they were waiting for a command from the captain. The lead FA was aware that opening the front doors would put the passengers at risk because the engines were still operating.

The flight crew proceeded with the QRC, which includes shutting down the engines and the APU as well as lowering the wing flaps (these are used as slides for evacuations). The QRC step that required the pulling of the engine and APU fire switches was not followed because the first officer deemed this action not relevant to the current situation. As a result, the emergency lights that would automatically activate and illuminate the area around the slides and over-wing exits did not turn on.

At 1817:51, the captain made the evacuation announcement over the aircraft public address system. The 2 front FAs assessed the outside environment for hazards, then opened the 2 front exits and deployed the slides. As per the WestJet evacuation procedures, the first officer then exited the aircraft to assist the passengers.

During the evacuation, the FAs issued instructions with and without the assistance of a handheld megaphone, telling the passengers to leave all their carry-on baggage behind. Despite these instructions, numerous passengers brought carry-on baggage with them, which slowed down the evacuation process. In addition to this delay, several passengers who exited through the left over-wing exits did not see a slide, or the arrows showing the exit route; as a result, they re-entered the cabin.

When the captain left the cockpit, he noticed that the emergency lights were not illuminated and re-entered the cockpit to determine why. He completed the QRC again and noticed that the APU was still operating. At 1820:11, the captain turned off the APU; the emergency lights subsequently activated.

Starting from the time at which the captain made the evacuation call, the evacuation took approximately 2 minutes and 23 seconds. Starting from the time at which the left over-wing exit was opened, it took 3 minutes and 9 seconds.

An FA who was stationed at the rear of the aircraft received minor hand injuries.

Once outside, the initial wave of evacuated passengers moved toward the satellite terminal in the area of Gate A4, which is located on the north side of the apron, and other passengers followed.

The ARFF response time was 3 minutes and 22 seconds. When ARFF arrived on scene, the fire in the Sunwing aircraft's tail and APU had subsided and was smouldering. As ARFF extinguished the remnants of the fire, a firefighter received minor injuries from exposure to secondary spray of water that was mixed with fuel from the APU.

Greater Toronto Airports Authority

The AMU is located in a tower at Terminal 1 and is operated by the GTAA. The AMU is staffed by GTAA employees, including apron radio officers, who operate under the provisions of the GTAA AMU standard operating procedures (SOPs).

The apron radio officers provide advisory traffic services to several apron and parking areas, including the Terminal 3 apron, the location of the occurrence. They are not licensed air traffic controller personnel, nor are they required to be under the *Canadian Aviation Regulations*.

Due to the large distances and obstructions, apron radio officers do not have a clear view of several of the aprons and parking areas, including the occurrence location. However, video cameras mounted in strategic locations provide multiple live video feeds of the apron areas to television screens located within the AMU.

Although the individual video feeds are recorded, the particular selection of video feeds that the apron radio officer had displayed on the monitor at the time of the occurrence is not. A post-occurrence review of the recorded video feed that focuses on Gate B13 clearly showed the WestJet aircraft parked behind the Sunwing aircraft at the time that the latter pushed back.

In addition to video, the AMU is equipped with airport surface detection equipment (ASDE), or ground radar, which provides apron radio officers with a real-time display of aircraft and vehicle traffic on the airport movement area. A review of the ASDE recording after the occurrence indicated that there was a radar target displayed directly behind the Sunwing aircraft.

The north apron radio officer indicated to the tow vehicle operator to "push back at your discretion." However, according to the AMU SOPs, pushback instructions for aircraft under tow are the same as for aircraft manoeuvring under their own power.³ Pushback information is to include the following:

- Aircraft [or tow vehicle, as applicable] Identification
- Traffic, as applicable
- Direction for the aircraft to push including lane number and tail direction as applicable
- Other special information [...]
- Instructions to call AMU back for taxi [or tow] instructions⁴

As well, traffic information should be provided as follows:

- Aircraft identification
- "Give way to" (if applicable)
- Number and type(s) of aircraft to pass (if applicable)
- Aircraft (carrier and types)
- Direction of traffic
- Location of traffic confliction⁵

The GTAA's *Ground Operations Manual* states that "[t]he operator shall ensure operational safety through the use of wing walkers or other industry accepted best practice."⁶

³ Greater Toronto Airports Authority, Apron Management Unit, *Standard Operating Procedures*, Version 1.2 (15 June 2014), Section 3.13, "Aircraft Under Tow," p. 18.

⁴ Ibid., Section 3.3, "Pushback Information," p. 13.

⁵ Ibid., Section 3.2, "Traffic," p. 12.

⁶ Greater Toronto Airports Authority, *Ground Operations Manual*, 1st edition (November 2016), Section D.5.3.5, "Wingwalkers/Marshalls," p. D-19.

A TSB investigation⁷ into a fire that broke out under a belt loader at Montréal/Pierre Elliott Trudeau International Airport, Quebec, included the following risk finding regarding an airport operator's oversight of its service provider's personnel and equipment:

If an airport operator's safety management system does not include monitoring the service providers working on the apron, there is a risk that inadequate procedures or equipment will be used or that the personnel will not be sufficiently trained.

Sunwing Airlines Inc.

Sunwing uses Swissport International Ltd. for its ground operations in Toronto, including towing and pushbacks. According to Sunwing ground-handling procedures, wing walkers are required for all pushbacks, whether or not the aircraft has passengers on board.

Sunwing conducted a ground operations station audit at Toronto in 2016. The audit found that wing walkers were in place for the aircraft's arrival and pushback; however, the audit did not specify whether passengers were on board the aircraft.

Swissport International Ltd.

During this occurrence, there were 2 Swissport employees in the cab of the tow vehicle. However, wing walkers were not used during the pushback process. In addition, the investigation found that the general practice at Swissport was to have wing walkers present for pushbacks only when aircraft have passengers on board. Otherwise, wing walkers were not present for pushbacks.

Swissport SOPs for pushbacks state the following: "A minimum of two wingwalkers as applicable and a pushback operator is required to conduct an aircraft movement."⁸

The tow vehicle operator had an airside vehicle operator's permit in accordance with GTAA policies.

WestJet Airlines Ltd.

The WestJet aircraft safety-features card, which is located in the passenger seatbacks, has a small illustration indicating that passengers are not to take personal belongings in the event of an evacuation.

The content of the pre-flight safety briefing specific to the occurrence flight could not be determined. However, sample pre-flight safety briefings⁹ in WestJet's *Flight Attendant Manual* (FAM) do not include passenger instructions regarding carry-on baggage in the event of an emergency evacuation.

Procedures within the WestJet FAM permit FAs to initiate evacuation procedures before the flight crew gives the signal to evacuate if they determine that the need to evacuate is obvious.¹⁰ In addition, the FAM states that if 1 FA has initiated an evacuation, FAs at other stations should also follow evacuation procedures.¹¹

⁷ TSB Aviation Investigation Report A13Q0186.

⁸ Swissport International Ltd., *Standard Operating Procedure, Ramp-022: Aircraft Ground Movement*, Version 5 (01 October 2017), Section 3.6.1, "Pushback," paragraph 4(i), p. 4.

⁹ WestJet, *Flight Attendant Manual*, Part A, Revision 6 (31 August 2017), Bulletin 17-14 (A), effective 12 September 2017, Section 6A.3.2, "Safety Demonstration," pp. 2-3.

¹⁰ *Ibid.*, Section 4A.10.2, "Evacuation Initiation," p. 43.

¹¹ *Ibid.*

Aircraft

The Boeing 737-800 has 8 emergency exits, including 2 at the front of the cabin, 4 over-wing exits, and 2 at the rear of the cabin. The exits at the front and rear are equipped with emergency slides, while the over-wing exits utilize the aircraft flaps as slides. The top of each wing, near the over-wing exits, is marked with arrows and lines indicating the exit route.

The aircraft is equipped with emergency lighting that illuminates the passenger cabin to show the exit routes. In addition, emergency lights illuminate the escape slides, over-wing escape routes, and ground contact area. These emergency lights automatically activate once the engine and APU fire switches are pulled, in accordance with the evacuation QRC. During this occurrence, the emergency lights did not activate until the captain returned to the cockpit and pulled the engine and APU fire switches. As a result, the exit route on the wings was not illuminated until all of the passengers had already egressed the aircraft.

During certification, the aircraft met the requirements of section 25.803 of the U.S. *Federal Aviation Regulations* and demonstrated that an emergency evacuation can be carried out while at maximum capacity within 90 seconds.

Evacuation procedures

Investigations into several other occurrences that involved emergency evacuations found that, as in this occurrence, passengers often attempt to retrieve their carry-on baggage during an emergency evacuation.

In 2007, following its investigation into the August 2005 overrun occurrence at Toronto/Lester B. Pearson International Airport,¹² the TSB found that many passengers took their carry-on baggage with them during the emergency evacuation of the aircraft, despite the fact that FAs repeatedly provided specific instructions to the contrary.

The Board believes that passenger safety briefings that instruct passengers not to bring their carry-on bags with them during an emergency evacuation would complement any existing measures to increase the efficiency and effectiveness of an emergency evacuation. Therefore, the Board recommended that

the Department of Transport require that passenger safety briefings include clear direction to leave all carry-on baggage behind during an evacuation.

TSB Recommendation A07-07

In 2009, Transport Canada (TC) issued Advisory Circular 700-012, *Passenger Safety Briefings*,¹³ providing voluntary guidance to operators regarding this issue. In 2013, in TC's latest response to TSB Recommendation A07-07, TC indicated that it had canvassed the major Canadian air carriers to determine the extent to which the direction to leave baggage behind during an emergency was being communicated to passengers.

¹² TSB Aviation Investigation Report A05H0002.

¹³ Transport Canada, Advisory Circular 700-012: *Passenger Safety Briefings* (Issue 01: 16 March 2009), at <https://www.tc.gc.ca/eng/civilaviation/opssvs/managementservices-referencecentre-acs-700-700-012-501.htm> (last accessed 27 June 2018).

As a result of this canvassing, TC stated that it was encouraged by the level of compliance with the voluntary guidance. Consequently, it planned no regulatory action that would require operators to provide this information to passengers, as stated in Recommendation A07-07.

The Board assessed TC's response as **Satisfactory in Part**. No further action is planned by TC, and continued reassessment will not likely yield further results. The recommendation was therefore assigned a **Dormant** status.

After this occurrence, TSB investigators randomly selected a small number of regularly scheduled flights on different airlines operating under Subpart 705 of the *Canadian Aviation Regulations*. Investigators observed the passenger safety briefings to determine whether passengers were being provided with instructions to leave baggage behind in the event of an emergency evacuation.

None of the briefings on the observed flights provided this type of instruction to the passengers at any point before or during the flight.

On 13 April 2018, TC released Civil Aviation Safety Alert (CASA) No. 2018-04 regarding passengers retrieving carry-on bags during evacuations. In the document, TC recommends that air operators address the issue internally, and plans to evaluate the effectiveness of air operators' response to the CASA in 9 months.

Summary

In this accident, the pushback was conducted without the use of wing walkers, which is not in accordance with Swissport, Sunwing, and GTAA requirements. The investigation also determined that wing walkers were normally used by Swissport only when pushing back aircraft with passengers on board. In addition, the GTAA apron radio officer used phraseology that was not consistent with GTAA AMU procedures.

WestJet's pre-flight safety briefings do not inform passengers to leave behind carry-on baggage in the event of an evacuation. During this occurrence, several passengers retrieved their carry-on baggage, despite the fact that FAs repeatedly provided specific instructions to the contrary. These passenger actions, in combination with the lack of emergency lighting, delayed the evacuation process.

This concludes the TSB's limited-scope investigation into this occurrence. The Board authorized the release of this investigation report on 04 July 2018. It was officially released on 11 July 2018.

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